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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/820,593	04/08/2004	Gilbert A. Hawkins	87168WRZ	8151

7590 05/07/2007

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EXAMINER	
STEPHENS, JUANITA DIONNE	
ART UNIT	**PAPER NUMBER**
2853	

MAIL DATE	DELIVERY MODE
05/07/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/820,593	HAWKINS ET AL.	
	Examiner	Art Unit	
	Juanita D. Stephens	2853	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *Amendment filed 2/5/2007*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-62* is/are pending in the application.

4a) Of the above claim(s) *3,6-14,19,20,23-25,38-44 and 51-57* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-2, 4-5, 15-16,18, 21-22, 26-30, 32-33, 35-37, 45-47, 49-50, 58, 60, 61* is/are rejected.

7)☒ Claim(s) *17,31,34,48,59 and 62* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *05 February 2007* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *8/29/2005, 4/8/2004*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claims 6-14, 19-20, 23-25, 38-44, and 51-57 are withdrawn.

Information Disclosure Statement

1. Acknowledgement is made of the Information Disclosure Statements filed 8/29/2005 and 4/8/2004.

Drawings

2. The drawings were received on 2/5/2007. These drawings are approved.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

4. Claims 1-2, 4-5, 15, 18, 21, 26, 45-46, 49-50, 60 are rejected under 35 U.S.C. 102(e) as being anticipated by Verlinden et al. (US 6,817,698 B2).

Verlinden et al. discloses a printhead (Fig. 2) comprising: **1)** a body (103), portions of the body defining a fluid chamber (defined within channels 104a, also inherent to piezoelectric printheads) and a nozzle orifice (ink terminate channels 104a), the nozzle orifice being in fluid communication with the fluid chamber, **2)** a drop forming mechanism (piezo) operatively associated with the nozzle orifice of the body(col 2, lns 40-41; col 6, lns 51-60), **3)** a plate (nozzle plate 102) removably positioned over the

body, the plate having at least one orifice (102a), the at least one orifice being in fluid communication with nozzle orifice of the body (col 1, lns 56-57; col 2, lns 6-9, lns 57-58; col 4, lns 51-56), **4)** the nozzle orifice (ink terminate channels 104a) of the body (103) having a diameter, wherein the at least one orifice (102a) of the plate (102) has a diameter, the diameter of the at least one orifice of the plate being less than the diameter of the nozzle orifice of the body (as shown in Fig. 2), **5)** the nozzle orifice of the body having a diameter, wherein the at least one orifice of the plate includes a plurality of orifices (102a), each having an individual diameter, the individual diameters of the plurality of orifices (102a) of the plate being less than the diameter of the nozzle orifice of the body (as shown in Fig. 2), **6)** the body having a surface (channel terminate surface 104) facing the plate (104) (col 2, lns 61-63), the plate having a surface facing the body, the surface being in contact with each other (as shown in Fig. 2), **7)** wherein the surfaces are maintained in contact with each other with an external clamping mechanism (col 4, lns 51-56), **8)** wherein the positions of the surfaces of the plate and the body are maintained relative to each other with a liquid (as shown in Fig. 2), **9)** wherein the surfaces are maintained in contact with each other with a force adjustable clamping mechanism such that the at least one orifice (102a) is positionable relative to the nozzle orifice (104a) of the body (col 4,lns 51-56) , **10)** wherein the shape of the at least one orifice of the plate is substantially round (as shown in Fig. 2), **11)** wherein the drop forming mechanism includes a heater (col 6, lns 56-60), **12)** a removable plate (nozzle plate 102) having a first position (attached) over the body (103) and a second position removed from the body, the plate having at least one plate orifice (nozzles

102a), the at least one plate orifice being in fluid communication with the fluid chamber (defined within channels 104a) of the body when the plate is located in the first position (attached) over the body, **13)** portions of the body defining a nozzle orifice (ink terminate channels 104a), the nozzle orifice being in fluid communication with the fluid chamber, wherein the nozzle orifice is located between the fluid chamber when the removable plate (nozzle plate 102) is in the first position (attached) over the body, **14)** wherein the printhead is operable to produce a fluid drop when the removable plate (nozzle plate 102) is located in the first position (attached) over the body (col 2, lns 40-41), **15)** wherein the fluid drop is a liquid drop (col 2, lns 40-41), and **16)** a removable plate (nozzle plate 102) having a first position (attached) over the body (103) and a second position removed from the body, the plate having at least one plate orifice (nozzles 102a), the at least one plate orifice being in fluid communication with the fluid chamber (defined within channels 104a) of the body when the plate is located in the first position (attached) over the body, wherein the nozzle orifice is located between the fluid chamber and the removable plate when the removable plate is in the first position (removed) over the body.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. Claims 27, 29-30, 33, 35-37, and 58 are rejected under 35 U.S.C. 103(a) as being unpatentable over Verlinden et al. (US 6,817,698 B2) in view of Abe et al. (US 5,367,324).

Verlinden et al. teaches the claimed invention, with the exception of 1) wherein the heater is a ring surrounding the nozzle orifice, 2) a heat conducting element positioned between the body and the plate, the heat conducting element being operatively associated with the heater, 3) wherein the heat conducting element is a ring surrounding the at least one nozzle orifice of the plate, 4) wherein the heater includes a plurality of individually actuable sections, 5) wherein the drop forming mechanism includes at least one electrical contact, 6) wherein the at least one electrical contact is positioned on a surface of the body facing the plate, and 7) a heater positioned between the body and the plate, the heater being electrically connected to the at least one electrical contact. Abe et al. at least teaches wherein the heater (184) is a ring surrounding the nozzle orifice (as shown in Fig. 17a and 17c), a heat conducting element positioned between the body and the plate, the heat conducting element being operatively associated with the heater (as shown in Figs. 17a-18c), wherein the heat conducting element is a ring surrounding the at least one nozzle orifice of the plate, wherein the heater includes a plurality of individually actuable sections (as shown in Fig. 18a-18c), wherein the drop forming mechanism includes at least one electrical contact (electrodes 181 and 359), wherein the at least one electrical contact is positioned on a surface of the body (substrate 174 and 177) facing the plate (194), and a heater (184) positioned between the body and the plate, the heater being electrically connected to

the at least one electrical contact (col 5, lns 55-65). It would have been obvious at the time the invention was made to a person having ordinary skill in the inkjet art to modify Verlinden et al. with the heater as taught to be old by Abe et al. for the purpose of eliminating cavitation damage, while extending the life of the heater.

7. Claims 16, 47 and 61 are rejected under 35 U.S.C. 103(a) as being unpatentable over Verlinden et al. (US 6,817,698 B2) in view of Hirano et al. (US 6,120,130).

Verlinden et al. teaches the claimed invention, with the exception of1) wherein the positions of the surfaces of the plate and the body are maintained relative to each other with a material having a melting point less than 100°C, and 2) wherein the printhead is operable to produce a fluid drop when the removable plate is located in the second position removed from the body. Hirano et al. at least teaches wherein the positions of the surfaces of the plate and the body are maintained relative to each other with a material having a melting point less than 50°C (col 27, lns 51-53) and a free surface type printhead. It would have been obvious at the time the invention was made to a person having ordinary skill in the inkjet art to modify Verlinden et al. with the melting point as taught to be old by Hirano et al. for the purpose of exhibiting low toxicity to the human bodies and being colorless.

8. Claim 22 is rejected under 35 U.S.C. 103(a) as being unpatentable over Verlinden et al. (US 6,817,698 B2) in view of Matta (US 6,183,067).

Verlinden et al. teaches the claimed invention, with the exception of wherein the shape of the at least one orifice of the plate is other than round. Matta at least teaches square nozzles (col 6, lns 6-9). It would have been obvious at the time the invention

was made to a person having ordinary skill in the inkjet art to modify Verlinden et al. with the square nozzles as taught to be old by Matta for the purpose of using anisotropic etch of simple fabrication of the nozzle.

9. Claim 28 is rejected under 35 U.S.C. 103(a) as being unpatentable over Verlinden et al. (US 6,817,698 B2) in view of Abe et al. (US 5,367,324) as applied to claims 27, 29-30, 33, 35-37, and 58 above, and further in view of Min et al. (US 2003/0210299 A1).

Verlinden et al. view of Abe et al. teaches the claimed invention, with the exception of the at least one nozzle orifice of the plate having a center, wherein the heater ring is located no more than 200 microns from the center of the at least one nozzle orifice of the plate. Min et al. at least teaches the at least one nozzle orifice of the plate having a center, wherein the heater ring is located no more than 200 microns from the center of the at least one nozzle orifice of the plate [paragraph 0033] (as shown in Fig. 3A). It would have been obvious at the time the invention was made to a person having ordinary skill in the inkjet art to modify Verlinden et al. in view of Abe et al. with the heater positioned at a proximity as taught to be old by Min et al. for the purpose of efficient bubble nucleation.

10. Claim 32 is rejected under 35 U.S.C. 103(a) as being unpatentable over Verlinden et al. (US 6,817,698 B2) in view of Moon et al. (US 2002/0149649 A1).

Verlinden et al. teaches the claimed invention, with the exception of a heat conducting element position on the plate, the heat conducting element being operatively associated with the heater. Moon et al. at least teaches a heat conducting element

position on the plate, the heat conducting element being operatively associated with the heater (as shown in Figs. 3 and 4). It would have been obvious at the time the invention was made to a person having ordinary skill in the inkjet art to modify Verlinden et al. with the heater arrangement as taught to be old by Moon et al. for the purpose of preventing the formation of unbalanced bubbles due to variations in local resistance of the heater.

Allowable Subject Matter

11. Claims 17, 31, 34, 48, 59 and 62 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Response to Arguments

12. Applicant's arguments with respect to claims 1-2, 4, 5, 16, 18, 21, 22, 26-30, 32, 35-37, 45, 49, and 50 have been considered but are moot in view of the new ground(s) of rejection.

Contact Information

13. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Juanita D. Stephens whose telephone number is (571) 272-2153. The examiner can normally be reached on Flex (Monday-Thursday 9:00 am -6:00 pm).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stephen Meier can be reached on (571) 272-2149. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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PRIMARY EXAMINER

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JDS
April 30, 2007